D9010MILP

Military Protocol Trigger and Decode for Infiniium Oscilloscopes

Introduction

The D9010MILP software package for Infiniium oscilloscopes gives you the ability to trigger and decode SpaceWire, ARINC429, and MIL-STD-1553 signals. This package applies to all Infiniium Oscilloscopes.

KEYSIGHT

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Product Overview

The ARINC 429 bus and the MIL-STD-1553 bus are serial buses used in both commercial and military equipment. While primarily used in avionics, these buses are also found in ground vehicles, weapons systems and other equipment. Because of their importance in both industry and defense, error free operation of both the ARINC 429 bus and the MIL-STD-1553 bus is crucial.

SpaceWire is a spacecraft communication network based in part on the IEEE 1355 standard of communications. It is coordinated by the European Space Agency (ESA) in collaboration with international space agencies including NASA, JAXA and RKA. SpaceWire supports highly fault-tolerant networks and systems, which is one reason for its popularity. SpaceWire is a standard for high-speed links and networks for use onboard spacecraft, easing the interconnection of sensors, mass-memories, processing units, and downlink telemetry sub-systems.

Figure 1. Protocol decoding of ARINC 429 showing a real time trace, protocol decoding table, and packet details using a symbolic decode.

Without intelligent oscilloscope serial bus protocol triggering and decode, it can be difficult to debug these buses and validate signal integrity. Traditional methods of debugging serial buses include manual bit counting, which is not only tedious, but prone to critical errors. Easily debug and test these serial buses through D9010MILP Protocol Triggering and Decode for Infiniium Oscilloscopes. This application provides an easy-to-use interface, a breadth of protocol decode options to suit your specific needs, pattern and error search options to find errors faster, and much more.

- Set up your scope to show protocol decode in less than 30 seconds
- Get access to a rich set of integrated protocol-level triggers
- Save time and eliminate errors by viewing packets at the protocol level
- Use time-correlated views to quickly troubleshoot serial protocol problems back to their timing or signal integrity root cause.

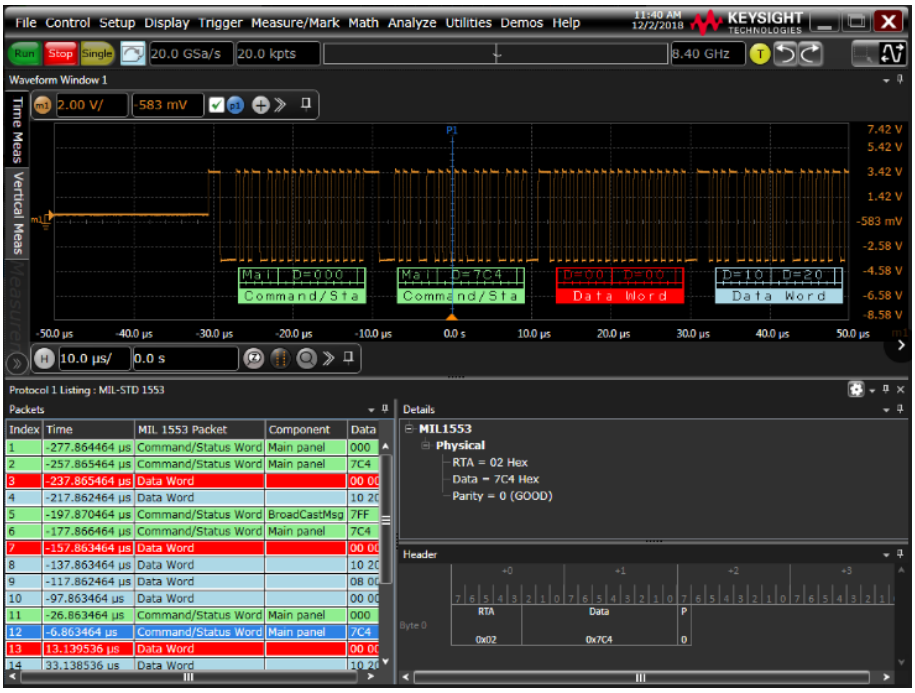

Figure 2. Protocol decoding of MIL-STD-1553 showing a real time trace, protocol decoding table, and packet details using a symbolic decode.

ARINC 429

ARINC (Aeronautical Radio INC.) 429 is a data transfer standard for aircraft avionics. It uses a self-clocking, self-synchronizing data bus protocol (Tx and Rx are on separate ports). The physical connection wires are twisted pairs carrying balanced differential signaling. The protocol allows for self-clocking at the receiver end, thus eliminating the need to transmit clocking data. ARINC 429 is an alternative to MIL-STD-1553.

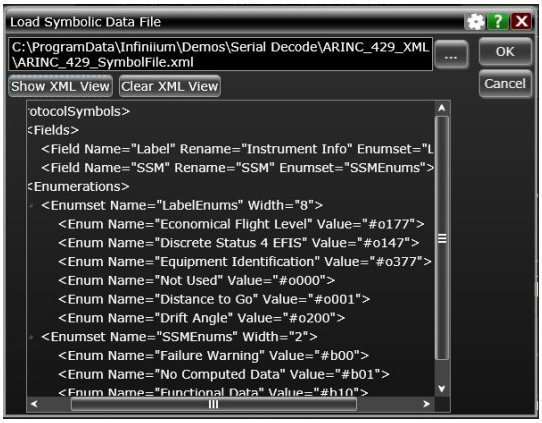

Figure 3. Symbolic decode XML file for ARINC 429

Specifications and characteristics

Signal sources	Any analog channel Any waveform memory Any waveform math
Signal types	Differential (A-B) Line A (non-inverted) Line B (inverted)
Baud rates	High (100 kbps) Low (12.5 kbps) User-defined
Auto setup	Automatically configures trigger levels, decode thresholds, sample rate, memory depth, holdoff, and trigger
Decode options	Word Format: • Label/Data • Label/SSM/Data • Label/SSM/Data/SDI Symbolic decode available: add labels to waveforms to customize decode formats for all fields using an XML file. All fields can have their values translated to strings. Default formats are: • Label format: octal • SDI format: binary • Data format: Hex, decimal, binary, ASCII • SSM format: binary • Error format: ASCII
Trigger options	ARINC 429 packet: label, SDI, data, SSM, parity Label range: user-defined Bits specific: word stop, word start, any 0 bits, any 1 bits, any bits Errors: gap, parity, word, word or gap, or any error

MIL-STD-1553

MIL-STD-1553 was originally designed as an avionic data bus for use with military avionics, but has also become commonly used in spacecraft subsystems, both military and civil. It features multiple redundant balanced line physical layers, a differential network interface, time division multiplexing, half-duplex command/response protocol, and can handle up to 30 Remote Terminals (devices). A single bus consists of a wire pair with 70–85 Ω impedance at 1 MHz.

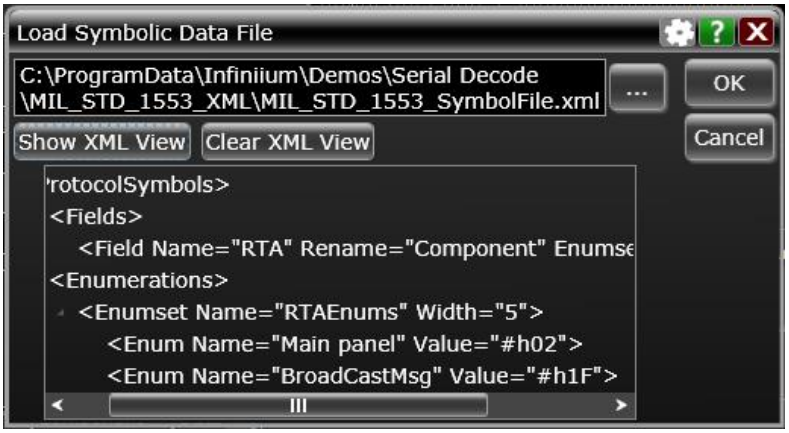

Figure 4. Symbolic decode XML file for MIL-STD-1553

Specifications and characteristics

Signal sources	Any analog channel Any waveform memory Any waveform math
Protocols supported	MIL-STD-1553A MIL-STD-1553B
Baud rates	1 Mbps (automatic)
Auto setup	Automatically configures trigger levels, decode thresholds, sample rate, memory depth, holdoff, and trigger
Decode options	Symbolic decode available: add labels to waveforms to customize decode formats for all fields using an XML file. All fields can have their values translated to strings. Default formats are: • Packet format: ASCII • RTA format: Hex • Data format: Hex, decimal, binary, ASCII
Trigger options	Command/status word: component, data, parity Data word: data, parity Specific events: data word and command/status word start/stop Errors: parity error, sync error, Manchester error, any error

SpaceWire

SpaceWire utilizes asynchronous communication and allows speeds between 2 Mbit/s and 400 Mbit/s, with an initial signaling rate of 10Mbit/s. SpaceWire also has very low error rates, deterministic system behavior, and relatively simple digital electronics. SpaceWire is bi-directional, using two twisted pairs in each direction.

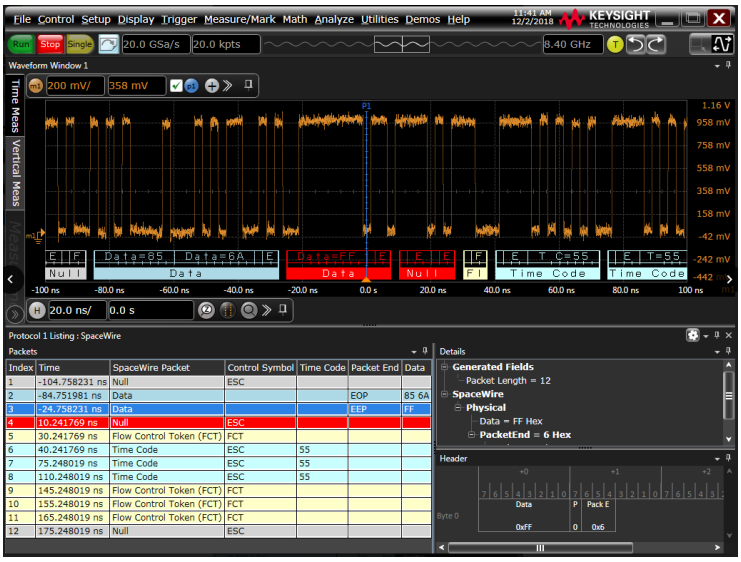

Figure 6. Protocol decoding of SpaceWire showing a real-time trace, protocol decoding table, and packet details.

Specifications and characteristics

Signal sources	Any analog channel Any waveform memory Any waveform math
Signal types	Differential (A-B) Line A (non-inverted) Line B (inverted)
Baud rates	User-defined (2 Mbps to 400 Mbps)
Auto setup	Automatically configures trigger levels, decode thresholds, sample rate, memory depth, holdoff, and trigger
Decode options	View nulls: yes or no Sync mode: nulls, pattern, automatic Null count: 1 to 4
Trigger options	Any packet Control characters: FCT, ESC, EEP, EOP, any Control codes: null, time code Data (up to two bytes) Errors (parity, escape, any)

Ordering Information

Required hardware

Model	Compatibility
D9010MILP	Infiniium 9000, S-Series, EXR-Series, MXR-Series, 90000, V-Series, Z-Series, UXR-Series

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Step 2. Choose your license term: perpetual or subscription.

Step 3. Choose your license type: node-locked, transportable, USB portable, or floating.

Step 4: Depending on the license term, choose your support subscription duration.

Example

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D9020ASIA Transportable Subscription 6-month license	Part Number D9020ASIA SW1000-SUB-01	Description Advanced Signal Integrity Software (EQ, InfiniiSimAdv, Crosstalk) 6-months, transportable subscription license

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